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The invention relates to an arrangement in accordance with the preamble of the claim 1.

The knowledge of absolute values of the linking up and the motive powers as well as its change bottom operating stress requires the design and judgment of screwed joints (set). Since the housing of force-measuring elements is in the view on it that the connections as such thereby not affected or changed to become to be allowed, in particular with short grips makes difficulties, it in particular usual to go the detour over a measurement of torque. This prior art method is however because of the high scattering of the friction values at the support surfaces of the screws and/or. Nuts qualitative only conditional suitable; dynamic measurements are not at all possible.

With screwed joints a length variation of its shank dependent of the grip and the stress section of the screw arises to schen law in accordance with the Hooke min with stresses, which can be consulted as measure for the biasing force and its variation bottom operating stress for the measurement. Also di Verfahren is not unproblematic however; so these length variations are in particular with short screws only from small order of magnitude, and additional difficulties result in the case of inaccessibility of the bolt ends as well as regarding assembly and operating conditions. So one can remember to arrange strain gauges at the inner wall of the screw provided with an axial bore. Here made however in adverse manner a detection D length variation only over a short measuring section; in addition also flexures become detected and are the cable guide difficult.

The GB-PS 7 50 445 describes a device for the pressure and measurement of tensile force with in paths of the force which can be measured the hollow cylinder which can be inserted, which takes up a bolt specified at one of the cylinder ends; this works on an angle lever specified at the other cylinder end, that for his part a radial plunger of an electromagnetic transmitter in response of the length variations of the hollow cylinder applied, led by the hollow cylinder. This known device allowed thus the evaluation of strength-dependent length variations of a relative prolonged part, i.e. the hollow cylinder, however is it relative complicated constructed and represents a pure measurement device, which is not connection arrangement an analogue screwed joint. Furthermore from the DE-OS 31 19 806 a measuring sensor to the detection of course and/or compression forces known, who essentially exhibits a strain gauge carrier with measuring bars disposed transverse to the force line of application in paths of the force which can be measured, those the strain gauges inertial. Also here it concerns however a pure measurement device.

The invention is the basis the object to create an arrangement in accordance with the preamble of the claim 1 those without impairment of the screw as such essentially seize from length variations at least a large axial prolonged range of their shank to purposes of the power measurement allowed, without difficulties by the installation conditions of the screw auftret

The solution according to invention of this object exists favourable formations of the invention in the characterizing features of the claim 1, describes the Unteransprüche.

Since the two ends of the threaded rod are in the range of the two ends of the screw supported, on the diaphragm-like, thus relative compliant disc disposed strain gauges at least essentially length variations of the entire bolt shank seize, so that relative large measurement signals develop. Of course one will arrange several strain gauges in bridge circuit with temperature compensation and if possible low sensitivity against bend of screw on the disc, as this actual from the measuring technique known is to be described and therefore here in detail not.

An embodiment of the invention becomes in the following explained on the basis the drawing, of them

Fig. 1 in exploded view a longitudinal section by the whole assembly and of them

Fig. 2 a plan view on the disc show.

Considered one first Fig. 1, then one recognizes the screw with the head 2 and an external thread the supporting shank 3 with 1. Over the entire screw-prolonged extended itself the axial longitudinal bore 4, which takes up the threaded rod 5 in the assembled state of the arrangement. This supports itself by means of their rod end 6 in the lowering drilling 7 to in Fig. 1 bottom end of the screw 1 off, while the upper, thread-supporting end of the rod 5 is screwed in in the assembled state of the arrangement into the threaded sleeve 8. This carries the diaphragm-like disc 9, those in accordance with Fig. 2 in this embodiment with four strain gauges 10 in electrical bridge circuit occupied is and itself in the recess 11 in in Fig. 1 upper end of the screw head 2 and/or. 1 for the screw supports. Thus the subassembly formed by threaded rod 5 and threaded sleeve 8 together with disc 9 clamps thus the screw 2 over its whole length practical. It means that the strain gauges 10 on the one hand by static stress of the screw 1 (bias) arising length variation the same and those length variations of the screw detected, which decrease/go back on dynamic loads in the operation. Due to the detection of the whole length of the bolt shank 3, which begins with the supporting federation 12 of the screw 1, the so gained measurement signals are relative large, so that the measurement with high accuracy made.

Furthermore important one for the achievement of an high measurement accuracy is that the threaded rod is subject

neither to torsion nor bending loads, which become detected of the strain gauges and could to incorrect signals lead.

Understandably the subassembly formed by threaded rod, threaded sleeve and disc can be also somewhat more short in particular as the screw with prolonged screws, so that the ends of this subassembly are somewhat remote of the ends of the screw supported. Also then the shown advantages result.

Like also the drawing occupied, is with the invention one would genericin accordance with-eat arrangement provided, those the structure of the screw - apart from the axial bore 4 and the countersink 11, which can represent a component of an interior many Kant for a tool - not affected. , The not represented electrical leads outgoing from the strain gauges 10 can be led away easy by the face of the screw head 2.

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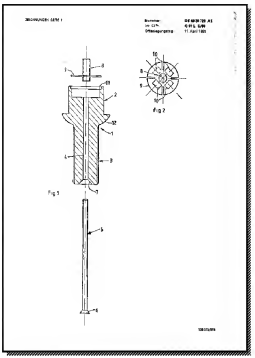

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1. Arrangement, a contained screw with head and shank as well as strain gauge comprising means to the determination in the installation condition of arising mechanical stresses of the screw by detection of length variations of the shank, characterised in that in an axial bore (4) of the screw (1) with clearance a threaded rod (5) guided are, away in the range of the bolt ends einenends over a rigid rod end (6), anderenends one over a diaphragm-like disc (9), occupied with the strain gauges (10), push.

2. Arrangement according to claim 1, characterised in that the disc (9) on one on the thread-supporting other end of the threaded rod (5) screwed on threaded sleeve (8) sits.

3. Anordnung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die Scheibe (9) von einer Vertiefung (12) des ihr benachbarten Schraubenendes aufgenommen ist.

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